DOCUMENT RESUME

ED 400 452 CE 072 835

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TITLE The Effects of Local Labor Demand on Individual Labor Market Outcomes for Different Demographic Groups and the Poor. Upjohn Institute Staff Working Paper 93-23.
INSTITUTION Upjohn (W.E.) Inst. for Employment Research, Kalamazoo, Mich.
SPONS AGENCY National Science Foundation, Washington, D.C.
PUB DATE Sep 93
CONTRACT SES-9109538
NOTE 23p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Adults; *Disadvantaged; *Economic Development; *Employment Programs; Grants; Labor Market; *Labor Needs; *Poverty; *Unemployment; Wages

ABSTRACT

A study was conducted using panel data on individuals (from the Panel Survey on Income Dynamics) to examine how local labor demand conditions affect the economic well-being of disadvantaged groups and the poor. The study assumed that growth in the metropolitan economy particularly helps disadvantaged individuals. A regression model using pooled time-series cross-section data was used, with the dependent variable in each case being the year-to-year change in some economic outcome for an individual, with a number of observations for each individuals. The data included observations from 1975-76 to 1986-87, with up to 2,252 males and 2,967 females in the samples. Independent variables include demographic characteristics of the individual, a set of variables measuring changes in local labor demand in the individual's metropolitan area, and interactions between these local labor demand variables and selected demographic variables. The study found that local labor demand conditions have disproportionate benefits for economically disadvantaged persons. Stronger local labor demand conditions can have important effects on poverty rates. For example, a 1 percent increase in an area's employment would reduce the numbers of poor females by around 5 percent and poor males by around 8 percent. The study suggests that publicly induced changes in labor demand, through public employment, wage subsidies for private employment, or enterprise zones, might significantly help disadvantaged persons. (Contains 21 references and 4 tables supporting the data.) (KC)

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The Effects of Local Labor Demand on Individual Labor Market Outcomes for Different Demographic Groups and the Poor

Upjohn Institute Staff Working Paper 93-23

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September 1993

I would like to thank Kevin Hollenbeck and Susan Houseman for comments on a previous version of this paper, Rich Deibel, Wei-Jang Huang, and Ken Kline for research assistance, and Claire Vogelsong and Ellen Maloney for secretarial assistance. This paper is based upon work supported by the National Science Foundation under Grant No. SES-9109538. Any opinions, findings, and conclusions or recommendations expressed in this paper are those of the author and do not necessarily reflect the views of the National Science Foundation.

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The Effects of Local Labor Demand on Individual Labor Market Outcomes for Different Demographic Groups and the Poor

1. Introduction

Economists have traditionally had a keen interest in the effects of overall labor demand on the economic well-being of different population groups, particularly disadvantaged groups. The stronger the effects of overall demand on the economic well-being of the poor, the more support there is for boosting demand to "solve" poverty. But an alternative view is that the poor's problems have complicated social causes, and cannot be solved except by changes in social institutions. To put it plainly: are some people poor because the economy lacks jobs for them, or are these people poor because of something they lack?

This debate has resurfaced in discussions of how to help the "underclass". Some researchers, such as William Julius Wilson (1987) and John Kasarda (1985, 1989, 1990), have attributed the growth of the underclass to the decline of central city manufacturing jobs. Other researchers, such as Lawrence Mead (1992), have attributed the growth of the underclass to cultural changes within the underclass community that have weakened the work ethic.

The traditional view of economists was that aggregate economic demand has particularly strong benefits for disadvantaged groups such as the poor, the less educated, and blacks (Okun, 1973; Clark and Summers, 1981; Blank and Blinder, 1986; Blank, 1989). The benefits of aggregate growth for the poor seem to have weakened in the 1980s. Despite the long 1980s expansion, the income distribution has widened, and poverty has been little improved (Cutler and Katz, 1991; Blank, 1991). These 1980s problems for the poor are thought to be due to decreasing relative demand for unskilled workers, and a slowdown in the relative growth of college-educated versus less skilled workers (Bound and Johnson, 1992; Katz and Murphy, 1992). The evidence for this theory is mostly indirect. With only one time series on the U.S. macroeconomy as evidence, it is difficult to tell whether the effects of aggregate demand on poverty have really diminished.

Because of the limited evidence in one time series of national data, some researchers have begun looking to local data to determine the effects of labor demand. The wide variety of demand conditions in local economies create a "natural laboratory" for determining the true effects of overall labor demand. These recent studies generally find that stronger local labor demand has significant benefits for the disadvantaged (Bartik, 1991a, 1991b, 1993; Freeman, 1989, 1991; Cain and Finnie, 1990). One implication of these findings is that national labor demand probably also has significant benefits for the disadvantaged.

The effects of local labor demand are also of interest in their own right, and not just in what they might imply for national labor demand. Many local policies, such as local economic development policies, deliberately affect local growth. At the national level, the U.S. has

generally not made significant efforts to intentionally alter the pattern of local and regional growth, but policies such as the interstate highway system probably have had important inadvertent effects on regional growth patterns. Other developed countries deliberately attempt to alter the pattern of local growth. If local demand conditions do have major effects on the disadvantaged, this raises the issue of whether some sort of national policy towards local and regional growth might plausibly be part of U.S. anti-poverty policy.

The contribution of this paper is to use panel data on individuals (specifically, data from the Panel Survey on Income Dynamics) to examine how local demand conditions affect the economic well-being of disadvantaged groups and the poor. Previous research on local labor demand conditions uses data from a single cross-section of local economies, or a time-series of cross-sections of regions. With such data, estimated effects of local labor demand conditions on average labor market outcomes might be attributable to changes in local population composition, as we would expect local demand conditions to change in- and out-migration patterns. Because panel data follows the same individuals over time, it can address the important issue of whether local labor demand conditions affect specific individuals.

This paper's estimates suggest that growth in the metropolitan economy particularly helps disadvantaged individuals. Local growth has stronger relative effects for males who are less educated, younger, or have lower expected earnings or work hours, and for females in poorer families. Local growth also has significant effects helping both males and females to exit from poverty, and helping prevent males and females from entering into poverty.

2. Local Labor Demand and Demographic Characteristics

I begin by considering how local labor demand's effects on labor market outcomes vary with an individual's demographic characteristics--his/her education, experience, race, and sex. Of particular interest are whether local labor demand's effects are greater for individuals who are usually disadvantaged in the labor market, such as less educated individuals and blacks.

Greater effects of local labor demand on the disadvantaged seem most compatible with non-market clearing labor market models. In such models, some job rationing and queues of unemployed workers occur in the labor markets, particularly for higher wage jobs. Disadvantaged workers may well be overrepresented in the queues of unemployed workers. Increased demand, by lowering unemployment, and allowing upward mobility to higher wage jobs, will help boost work hours and wage rates for disadvantaged workers.[1]

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[1] Of course, greater effects of local labor demand on the disadvantaged might also be rationalized in a market-clearing labor market model with the right assumptions about the relative labor supply elasticities of different groups, the skill mix of the increased labor demand, and the response of employers to changes in relative wages of different groups.

Model and Data

The basic model is a regression using pooled time-series cross-section data. The dependent variable in each case is the year-to-year change in some economic outcome for an individual, with a number of observations for each individual. These individual data come from the Panel Survey on Income Dynamics. The data include observations from 1975-76 to 1986-87, with up to 2252 males and 2967 females in the samples. The model includes a complete set of year dummies for each period. Other independent variables include demographic characteristics of the individual, a set of variables measuring changes in local labor demand in the individual's metropolitan area, and interactions between these local labor demand variables and selected demographic variables.

The estimating equations can be written as:

(1) $$\Delta Y_{imt} = B_0 + \underline{B}_1' \underline{X}_{imt} + \underline{B}_2' \underline{D}_{mt} + \underline{B}_3' \underline{X}_{imt} \times \underline{D}_{mt} + \epsilon_{imt}$$ where:

ΔY_{imt} = the change from year t-1 to year t in the natural logarithm of some economic outcome variable for individual i in MSA m. Economic outcome variables considered include annual real earnings, annual work hours, real wage rates, and the income/needs ratio for the individual's family.[2]

$\underline{X}_{imt}$ = a vector of control variables, including a complete set of dummies for the year of the observation, and the demographic characteristics of the individual such as education, experience, and race. Gender is controlled by estimating all equations separately for males and females.

$\underline{D}_{mt}$ = variables measuring local labor demand changes in the individual's MSA. These labor demand change variables include MSA employment growth, changes in the share of manufacturing in MSA employment, and changes in the average national "wage premium" paid by the MSA's industry mix.

$\underline{X}_{imt} \times \underline{D}_{mt}$ = interaction variables between local labor demand variables and selected individual demographic characteristics: education, experience, experience squared, and a categorical variable for whether the individual is black.

ϵ_{imt} = the disturbance term.

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[2]Real variables were calculated using an estimated MSA price index. See the Appendix and Bartik (1993) for details.

Table 1 contains more detailed descriptions and statistics on the model's dependent variables, and main independent variables of interest.[3] The dependent variables are meant to reflect the main economic outcomes of interest--an individual's earnings, and his/her family's economic status as measured by the income/needs ratio. The hours and wages variables represent the main avenues by which individual earnings may increase.

The labor demand variables represent some of the main types of labor demand change that have been speculated to affect labor market outcomes for the disadvantaged. Overall local labor demand is measured by the MSA employment growth variable. In addition to the overall state of local labor demand in the local labor market, researchers such as William Julius Wilson and John Kasarda have attributed problems of the urban poor to the decline of "good jobs", jobs which pay well relative to the skills required. The wage premium variable used here attempts to roughly measure that notion of good jobs. Many high "wage premium" jobs are in manufacturing. The manufacturing share variable is included so that we can see whether it is really changes in high wage premium jobs, or just changes in manufacturing, that affect the labor market outcomes of the disadvantaged.[4]

Regressions not reported here considered including up to 4 lags in the labor demand variables. The specification without any lags was preferred according to the Akaike Information Criterion.

The interaction terms--education, experience and experience squared, and race--were chosen in part because these variables are traditionally used in labor market analysis. Preliminary experimentation suggested that these interaction terms adequately captured how labor demand variables' effects were altered by the individual's education and experience.[5]

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[3] The Appendix provides more information on the derivation of the PSID sample, and the data sources for the local labor demand variables.

[4] Some preliminary regressions also included a variable measuring changes in the average "educational requirements" of the local economy. This "educational requirements" variable was derived by weighting each industry's average years of education of its employees, based on national data, by each industry's share oflocal employment. The educational requirements variable did not prove to be statistically significant in preliminary regressions, and so was dropped from the final results presented here.

[5] The tests used a real earnings change dependent variable, all control variables, and two lags in growth. I tested four experience interaction specifications, ranging from experience only being interacted up to a quartic in experience; education and race were also included as interaction terms in these four alternatives. The optimal AIC specification was a quadratic interaction for males, and a linear interaction for females. For education, I tried adding the different possible combinations of high school completion and college completion dummies as interaction terms to a model that already included education as an interaction term. The education models also included race and a quadratic in experience as interaction terms. The optimal model for males had education alone as an interaction term, while the optimal model for females had no education interaction terms.

Controlling year dummies avoids making inferences based on national trends in the economic outcome and labor demand variables. National trends in these variables could be spuriously correlated.

The models are estimated in a regression corrected for first-order serial correlation. Reported models do not control for the possible endogeneity of MSA growth and the other MSA labor demand variables. MSA growth might be endogenous because labor supply shocks that lower local wages might increase local employment. This endogeneity would be expected to lead to underestimates of the overall positive effects of MSA employment growth on wages and hence earnings and the income to needs ratio. Some preliminary estimates tried out as instruments the predicted change in MSA employment growth, and the other MSA labor demand variables, if each industry in the MSA had grown at the same rate as its national counterpart from year t-1 to year t. This roughly reflects the influence of changes in national demand for an MSA's export industries.[6] The resulting estimates were usually not significantly different, based on Hausman tests, from the estimates reported here.[7] But the instrumental estimates were quite imprecise, which suggests that these Hausman tests have low power. Hence, the estimates reported here may be biased to some extent by endogeneity, but there is little that can be done about this without better instruments.

The sample is restricted to individuals who stayed in the same MSA from year t-1 to year t. This restriction to "stayers" could potentially cause selection bias. I ignore this possible selection bias in the current paper.

Results

Table 2 presents estimates of how MSA labor demand effects vary by demographic group. The "average" MSA labor demand effects, given in the rightmost column of Table 2, are sensible. Growth has significant effects for both males and females on real earnings and the real income/needs ratio, with a 1% increase in MSA employment increasing real earnings and income by about 1/2 of 1%. These significant effects on earnings are due roughly equally to effects on annual work hours and real wages.

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[6] Such an argument is presented in more detail in Bartik (1991a).

[7] These instrumental estimates were done for specifications with the change in real earnings as a dependent variable, and no interaction terms. The only labor demand variable whose estimate differed significantly from the non-instrumental specification was the effect of the manufacturing share on male earnings, which was significantly negative in the instrumental estimates, and has no significant effects in non-instrumental estimates without interaction terms.

Increases in the share of high-wage industries in the MSA also significantly increase both male and female real earnings, and the female income/needs ratio.[8] A shift to an MSA industrial structure with a 1% higher wage premium increases average annual real earnings by around 5%. For males, most of this increase is due to increases in annual work hours. These greater annual work hours could represent a labor supply response to the higher wage rates of better jobs, or could be caused by other characteristics of these better jobs, such as lower turnover rates. For females, the estimates are too imprecise to break down how much of the wage premium variable's effects on earnings are due to hours effects versus wage effects.

Changes in the MSA manufacturing share have insignificant average effects on the male labor outcome variables. Increases in the MSA manufacturing share seem to have some negative effects on female earnings and wages.

The variation across demographic groups in MSA labor demand effects also is sensible. MSA employment growth's effects on earnings and the income to needs ratio are larger for less educated males. The larger earnings effects for the less educated are largely due to greater effects on annual work hours. In addition, MSA employment growth has larger effects on the earnings of younger and older males compared to middle-aged males. In contrast, the effects of growth on female annual hours worked and earnings are stronger for middle-aged females compared to younger and older females. Growth's effects appear to be larger for groups that are more on the margin between participating or not-participating in the labor market.

Increases in the MSA's industry wage premium have larger effects on the earnings and income to needs ratio of more educated males. These larger earnings effects for the more educated are mostly due to larger effects on work hours. These results are consistent with the belief that jobs in high wage-premium industries are rationed to more educated males.

None of the interaction terms with the manufacturing share variable are statistically significant at the 5% level.

These differences in labor demand effects across different groups are large. A one standard deviation change in education (2.9 for males, 2.4 for females) would change the effect of growth or the wage premium on earnings, annual work hours, or the income to needs ratio, by a large amount compared to the mean effects of growth or the wage premium. For example, for a male with one standard deviation less education than average, a 1% growth shock to MSA employment would increase annual work hours by around 1%, about triple the growth effect for the average male.[9] Changes in experience also make a large difference. As figure 1 shows, a

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[8] The lack of significant effects on the male income/needs ratio may be due to effects on family structure, such as more males getting or staying married.

[9] The average male effect of growth on annual hours is .306, or approximately a .3% increase in hours when MSA employment growth is shocked by 1%. One standard deviation less education(2.9 years) will increase this effect by .670(=2.9 times interaction coefficient of -.231). The total effect will then be .976, or approximately a 1% increase in

one standard deviation change in experience (9.5 years for males and females) would alter the effects of growth by a large amount compared to the mean earnings effect of growth.

3. Local Labor Demand Effects: Variation by Permanent Economic Status

I also estimated the distributional effects of local labor demand conditions using another approach: examining how the effects of local labor demand on individual economic outcomes vary with the "predicted economic status" of the individual. For a particular economic outcome variable, the "predicted economic status" of the individual is a measure of the individual's "permanent" level of that economic outcome variable.

Analyzing distributional effects by predicted economic status is more directly relevant to policy than analyzing effects by demographic group. For policy purposes, what we most want to know is whether local labor demand conditions tend to have greater effects for those individuals who are more economically disadvantaged. Analyzing effects by permanent economic status directly addresses this issue. "Permanent economic status" is a more important way of analyzing distributional effects than more temporary measures of economic status, because we want to know whether demand conditions help the permanently disadvantaged, not just those temporarily down on their luck.

The equations estimated can be written as:

(2) $$\Delta Y_{imt} = B_0 + \underline{B}_1' \underline{X}_{imt} + \underline{B}_2' \underline{D}_{mt} + B_3 Y_i^P + \underline{B}_4' (Y_i^P \underline{D}_{mt}) + \epsilon_{imt}$$

where:

ΔY_{imt} is the change from year t-1 to year t in the logarithm of some economic outcome variable (annual real earnings, annual work hours, real wage rates, or the income/needs ratio for the individual's family) for individual i in MSA m.

$\underline{X}_{imt}$ is a vector of control variables, including time dummies and the demographic characteristics of the individual;

$\underline{D}_{mt}$ represents variables describing local labor demand conditions in the MSA: MSA employment growth, change in the share of MSA employment in manufacturing, and changes in the average national "wage premium" in the MSA due to changes in the MSA's industry mix.

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annual work hours for a 1% increase in MSA employment.

Y^P_{it} is the logarithm of the predicted level of some economic outcome variable (annual real earnings, annual work hours, real wage rate, or the income/needs ratio for the individual's family) for individual i in year t. The derivation of this predicted level is discussed below.

(Y^P_{it} $\underline{D}_{mt}$) represents the interaction terms between the local labor demand condition variables and the predicted economic outcome variable.

ϵ_{imt} is the equation's disturbance term.

To keep the estimating equations parsimonious, only one predicted economic outcome variable was included as an independent variable and in the interaction term in any particular version of equation 2: the predicted level of the economic outcome variable whose change is used as the dependent variable. Thus, when the change in annual earnings is the dependent variable, the predicted level of annual earnings is used as an independent variable and in the interaction term, whereas predicted annual hours is used as an independent variable and interaction term when the change in annual hours is the dependent variable.

To predict "permanent economic status", preliminary equations were estimated. The prediction equation for each economic outcome used as a dependent variable the logarithm of the level of each economic outcome variable.[10] The prediction equation used as independent variables the demographic variables, and the average level of the corresponding economic outcome variables from years t-3 through t-5. Time dummies were excluded because they reflect transitory influences on economic outcomes. Local labor demand variables were excluded because I wanted to estimate what the individual's economic status would have been ignoring their MSA's economic conditions. The economic outcome variables used as independent variables in the prediction equation were lagged 3 to 5 years to minimize possible correlation between predicted economic status and the disturbance term in equation (2).[11]

Table 3 reports estimates with these new interaction terms. Growth's effects on male earnings are greater for low predicted earnings males, and growth effects on male annual work hours are greater for low predicted work hour males. Growth effects on the female income to needs ratio are greater for females with low predicted levels of the income to needs ratio. These interaction effects are "large" in that a one standard deviation change in predicted status alters growth's effects by a large amount compared to growth's mean effect. For example, a reduction

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[10] As noted in Table 1, some observations for some dependent variables can take on zero values, so small positive numbers were added to all observations before taking logarithms. Table 1 gives the small positive numbers used for each dependent variable.

[11] Alternative interaction terms might be the actual economic outcome level from year t-1, or the average level from years t-3 through t-5. But these variables will be a poorer measure of permanent economic status that the variable used here. In addition, economic outcome levels from year t-1 are probably correlated with the disturbance in equation (2). Some preliminary experimentation with using average levels from years t-3 through t-5 yielded similar results but with larger standard errors.

in the male "permanent earnings" level of one standard deviation (a change in log predicted earnings of .71) would increase the earnings effect of MSA employment growth by .414(=.71 times -.583 interaction coefficient in Table 3), which is large compared to the earnings effect of growth for the average male of .587 (the effect at the mean in Table 3). Thus, a 1% shock to MSA employment would increase the average male's real earnings by a little over 1/2 of 1%, but would increase earnings for low "permanent earnings" males by about 1%, almost twice as much. In sum, these results suggest that growth's effects on economic outcomes are greater for males who otherwise would have had low involvement with the labor market, and for females who might be married to such males.

The manufacturing share variable's effects are larger on male earnings for high predicted earnings males, and on male hours for high predicted hour males. The manufacturing share variable's effects on female wages are greater for high predicted wage females. This pattern of manufacturing share effects makes sense because one would think that higher earnings males and higher hours males, and higher wage females, are more likely to be employed in manufacturing.

The wage premium variable's effects do not differ significantly with predicted economic status.

4. Local Labor Demand Conditions and Poverty

The estimates in sections 2 and 3 suggest that stronger local employment growth has greater labor market effects for individuals who are more "disadvantaged" by having less education, or lower expected annual earnings or work hours. But the estimates do not bear directly on the issue of whether local employment growth actually helps to reduce poverty.

To examine the effects of local labor demand conditions on poverty status, I estimated four probit models, two for males and two for females. One pair of probit models estimated the probability of exit from poverty for individuals who were initially poor. The other pair of probit models estimated the probability of entry into poverty for individuals who were initially non-poor. The dependent variable in each probit model was a zero-one dummy variable for whether the individual was poor as of year t. Initial poverty status was measured based on the individual's average income to needs ratio in years t-3 through years t-5.[12]

Each probit model included all the usual control variables for time periods and individual demographic characteristics. In addition, each model included the current value and two lags in the three local labor demand condition change: MSA employment growth, wage premium change, and manufacturing share change. Two lags in the local labor demand change variables were

[12]The PSID needs measure, which is 25% greater than the official poverty line, was used to determine the individual's poverty status. The PSID tends to have greater income reporting than usual Census data bases. Also, the official poverty line may be lower today than what most citizens would view as a minimally acceptable living standard.

included to reflect all the local demand changes that might have affected the individual between year t-3 and year t. Each probit model also included as a control variable the logarithm of the "initial" value of the individual's income to needs ratio during years t-3 through t-5, because the probability of exiting or entering poverty is greater for individuals initially near the poverty line.[13] The probit models also included interaction terms between each local labor demand change variable and the logarithm of the initial income to needs ratio, to allow flexibility in how effects of labor demand change variables are altered by the individual's initial economic status.

Table 4 presents estimated long-run effects (i.e., the effects after two years) of the local labor demand condition change variables on poverty exit and entry. MSA employment growth is the only labor demand change variable that consistently has statistically significant effects on individuals' probabilities of exiting or entering poverty.

In interpreting the results, recall that the logarithm of the initial income/needs ratio, the variable interacted with the demand variables, will be zero when the individual's family is at the poverty line.[14] The coefficient on growth by itself thus shows the effects of growth on poverty entry and exit for sample members who are close to the poverty line. The column labelled "probit effect at means" presents effects for the "average" poor individual, for the poverty exit equations, and effects for the average non-poor individual, for the poverty entry equations. The results indicate that local growth significantly reduces the probability of poverty entry for non-poor individuals who are just above the poverty line (because the coefficient on growth by itself is significant for these two probit equations), but that local growth does not have significant effects on poverty entry for the average non-poor individual, whose income would be about triple the poverty line. Local growth has significant effects on poverty exit for the "average" poor male or female, whose income is somewhat below the poverty line. Local growth's effects appear to be lower for poor males who are close to the poverty line, possibly because their probabilities of exiting from poverty are quite high in any event.

To get a sense of the size of MSA growth's effects on poverty, Figures 2 and 3 present simulations of the effects of increasing an MSA's employment by 1%. To derive the figures, probit coefficients are first used, with actual values of each individual's independent variables, to compute a baseline probability of exiting or entering poverty for each sample individual. The sums of these baseline probabilities across individuals give the expected numbers of individuals who will exit poverty, enter poverty, or remain in their initial status. These probabilities and sums of probabilities are then recomputed after adding .01 permanently to the natural logarithm of MSA employment for each individual in the sample. The difference between the baseline and

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[13] Before taking the logarithm, .20 was added to the income/need ratio for all observations, to avoid taking the logarithm of zero in cases where the individual's family had zero income.

[14] Actually, because the interaction term is the logarithm of (the initial income/needs ratio plus .20), the interaction term will be exactly zero when the initial income/needs ratio is .80, and will be .182 when the individual's income/needs ratio is 1.0.

alternative numbers represent the "average" effects, given the distribution of income in this sample, of increasing MSA employment by 1%.

This simulation indicates that a 1% increase in an MSA's employment would reduce the numbers of poor females by around 5% and poor males by around 8%. These numbers are large relative to the number of poor people. The effects of MSA employment growth on female poverty are due about equally to effects on exits from and entries into poverty. The effects of MSA employment growth on male poverty are due more to effects on entries into poverty than they are to effects on exits from poverty.

IV. Conclusion

This paper provides empirical evidence that aggregate local labor demand conditions have disproportionate benefits for the economically disadvantaged. Stronger local labor demand conditions can have important effects on poverty rates.

This paper's estimates suggest but do not prove that publicly-induced changes in labor demand--through public employment, wage subsidies for private employment, enterprise zones, etc.--might also significantly help disadvantaged persons. More empirical research and experimentation with different public interventions affecting local labor demand is needed to determine which demand policies might be most cost-effective in helping the disadvantaged and reducing poverty.

APPENDIX

The data on dependent variables and the demographic variables come from the Panel Survey of Income Dynamics. The data come from the 1988 PSID cross-year family-individual response and non-response files.[15] These files contain data up through the 1988 interview, which reports information on labor market outcomes for individuals and families in 1987. Only information from 1975 and later are used because information on some economic development variables is not available prior to 1975.

PSID observations are included in the sample based on the following criteria[16]:

1. The individual is a PSID "head" or "wife" as of the interview year. More reliable information is available in the PSID on heads or wives.

2. The individual is between the ages of 26 and 55 as of the interview. This reduces complications caused by schooling or retirement decisions.

3. The individual is a non-Hispanic white or black. The PSID does not have sufficient sample size for other racial groups.

4. The annual earnings or hours for individual in the current year or the preceding year must not have been subject to "major assignment".[17] "Major assignment" implies that the reported numbers were probably predicted by PSID staff. In addition, the wage rate (annual earnings divided by annual hours) must be between $1/hour and $200/hour if hours were positive. Finally, the change in the natural logarithm of the wage rate from the preceding to current year must be less than 2 in absolute value. These wage rate restrictions eliminate observations that have implausible levels or changes in wages.

The annual earnings, wage rate, income to needs ratio, and poverty status variable were calculated in real terms using a local price index for each MSA and year.[18] These local price

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[15] Individuals are included in the sample even if they had left the PSID for some reason prior to the 1988 interview.

[16] Individuals were only included in the estimation sample if they were in an original PSID family as of the initial 1968 interview. Only these individuals have known probabilities of being sampled and calculated PSID sample weights. In retrospect, this restriction may have been a mistake, as I decided not to use the sampling weighting information.

[17] In addition, for equations whose dependent variable is the change in family income to needs, observations were only included if the sum of assignment variables for all family income components is less than 2 for both the current and preceding year. This assures that no family income component has been subject to "major assignment", coded as 2 for each component.

[18] These predictions were done for an earlier project (Bartik, 1993). Because a few MSAs in the PSID were not part of the earlier project, there are some "missing values" for price indices, leading to missing values for real variables. This accounts for the minor discrepancies between sample sizes for regressions using an hours change dependent variable

indices were based on actual BLS price and inflation data for some MSAs (38 MSAs for price data as of 1978, and 24 MSAs for inflation data for entire time period). Price levels and inflation rates for other MSAs were predicted based on preliminary regressions, with various regional dummies, regional inflation rates, and MSA labor demand variables as regressors.[19]

Data on local labor demand variables is derived from a combination of the MSA files of the Regional Economic Information Service (REIS) of the U.S. Bureau of Economic Analysis, and ES-202 files, derived from unemployment insurance records, from the U.S. Bureau of Labor Statistics (BLS). The REIS data were used for MSA total employment and one-digit employment numbers. The ES-202 two-digit shares of ES-202 one-digit industry employment totals were multiplied by REIS one-digit employment numbers to get two-digit industry numbers consistent with REIS totals.[20]

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and regressions using an earnings change dependent variable.

[19]More details on the procedures used to generate local price indices are provided in the Technical Appendix to Bartik (1993).

[20] Industry data suppressions were overcome by interpolation and extrapolation. More details on procedures for estimating suppressed industries are provided in the technical appendix to Bartik (1993).

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Table 1
Description of Key Variables Used in Analysis

Variable	Description	Mean (Male; Female)	Standard Deviation (Male; Female)
DEPENDENT VARIABLES			
Real Earnings Change	ln(annual real earnings of individual in year t) + $1000) - ln(annual real earnings of individual in year t-1 + $1000)	-.005; .031 (mean real earnings is $30,731 for males, $10,878 for females)	.525; .627
FTE Hours Change	ln(((annual work hours of individual in year t)/2000) + .05) - ln(((annual work hours of individual in year t-1)/2000) + .05)	-.017; .024 (Mean annual hours is 2027 for males, 1141 for females)	.510; .745
Real Wage Change	ln(average real hourly wage of individual in year t) - ln(average real hourly wage of individual in year t-1)	.014; .024 (Mean real wage is $15.33 for males, $9.69 for females	.358; .398
Income/Needs Change	ln((income to needs ratio for individual's family in year t) + .20) - ln((income to needs ratio for individual's family in year t-l) + .20). "Needs" number is PSID's "needs" number, which is 25% greater than poverty line for family.	.021; .019 (Mean income to needs ratio is 3.80 for males, 3.20 for females)	.330; .336
LOCAL LABOR DEMAND VARIABLES			
MSA Employment Growth	ln(employment in the individual's MSA in year t) - ln(employment in the individual's MSA in year t-1)	.025; .025	.028; .027
MSA Wage Premium Change	$\sum_i W_i S_{imt} - \sum_i W_i S_{imt-1}$, where W_i is "wage premium" for 2-digit industry i (difference between average wage in industry i and what we would expect based on workers' characteristics, according to Table IV of Krueger and Summers); S_{imt} is share of MSA employment in 2-digit industry i in year t. Wage premiums are defined as differences in logarithms of wages.	-.0013; -.0013	.0025; .002
MSA Manufacturing Share Change	Proportion of MSA employment in manufacturing in year t - proportion of MSA employment in manufacturing year t-1.	-.0035; -.0036	.0070; .0067
DEMOGRAPHIC VARIABLES FOR INTERACTION			

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Variable	Description	Mean (Male; Female)	Standard Deviation (Male; Female)
Education	Number of years of education completed	12.67; 12.22	2.91; 2.46
Experience	Age - years of education - 6	19.2; 20.3	9.5; 9.5
$(\text{Experience})^2$		461.6; 503.0	418.0; 416.1
Black	=1 if individual is black; =0 otherwise (sample is restricted to blacks and whites)	.331; .448	.471; .497

Notes: The earnings, hours, and income/needs variables have small positive numbers added to all observations before taking logs, to avoid the problem of taking the logarithm of zero for some observations. For the overwhelming majority of observations, adding these small positive numbers has little effect.

In addition to the demographic variables used in interactions, other demographic controls include high school and college completion dummies, splines allowing a year of post-secondary or graduate education to have different effects than a year of primary or secondary education, and $(\text{experience})^3$ and $(\text{experience})^4$. Also, all equations include a complete set of time dummies.

Sample size for reported descriptive statistics varies for different variables. The sample sizes for the real wage variables are 13,600 for males and 13,217 for females. The sample sizes for the income/needs variables are 12,994 for males and 16,998 for females. The sample sizes for the hours variable are 14,468 for males and 19,795 for females. The sample sizes for all other variables are 14,463 for males and 19,780 for females.

Real values were calculated using MSA and year-specific price indices. See the Appendix for more details on the construction of those price indices.

Table 2
Estimates of How Effects of MSA Labor Demand
on Individual Labor Market Outcomes Vary
with Education, Experience and Race

MSA Labor Demand Variables	Coefficient on Demand Variable by Itself	Interaction with Education	Interactions with Experience	Interaction with Experience^2	Interaction with Black	Effect of Demand Variable at Means of Demographic Characteristics
MALES						
EARNINGS DEPENDENT VARIABLE						
Growth	5.798*** (1.326)	-.234*** (.072)	-.209*** (.086)	.00406*** (.00197)	-.292 (.393)	.598*** (.212)
Wage Premium	-31.38* (19.74)	2.225*** (1.039)	.436 (1.274)	.00124 (.029)	-.768 (5.859)	5.500*** (2.757)
Manufacturing Share	5.72 (7.19)	-.549* (.377)	.204 (.454)	-.0083 (.010)	2.60 (2.135)	-.290 (.976)
HOURS DEPENDENT VARIABLE						
Growth	4.637*** (1.281)	-.231*** (.069)	-.126* (.083)	.00207 (.00191)	.179 (.381)	.306** (.176)
Wage Premium	-29.089* (19.13)	1.768** (1.007)	.823 (1.235)	-.0105 (.028)	3.398 (5.676)	5.391*** (2.667)
Manufacturing Share	5.634 (6.968)	-.413 (.365)	.0017 (.439)	-.0022 (.010)	-.281 (2.068)	-.675 (.950)
WAGES DEPENDENT VARIABLE						
Growth	1.360* (.852)	-.021 (.046)	-.0702 (.056)	.00169* (.00129)	-.408* (.254)	0.391*** (.157)
Wage Premium	-.828 (12.920)	.341 (.675)	-.322 (.840)	.0089 (.019)	-2.029 (3.821)	0.747 (1.790)
Manufacturing Share	-1.259 (4.686)	-.133 (.244)	.322 (.298)	-.00910* (.00695)	2.275* (1.396)	-0.209 (.633)
INCOME/NEEDS RATIO DEPENDENT VARIABLE						
Growth	3.150*** (.866)	-.144*** (.046)	-.069 (.056)	.00119 (.00130)	.283 (.261)	0.644*** (.140)
Wage Premium	-21.61** (12.84)	1.638*** (.675)	-.292 (.831)	.0177 (.019)	-.882 (3.879)	1.415 (1.809)
Manufacturing Share	5.305 (4.700)	-.425** (.245)	.178 (.297)	-.00765 (.00691)	1.439 (1.405)	0.283 (.632)

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Table 2 (continued)

MSA Labor Demand Variables	Coefficient on Demand Variable by Itself	Interaction with Education	Interactions with Experience	Interaction with Experience^2	Interaction with Black	Effect of Demand Variable at Means of Demographic Characteristics
FEMALES						
EARNINGS DEPENDENT VARIABLE						
Growth	.0307 (1.624)	-.0365 (.081)	.156* (.101)	-.00448** (.00231)	-.002 (.391)	.497*** (.234)
Wage Premium	.322 (24.03)	-.099 (1.281)	-.099 (1.506)	.0106 (.0340)	6.115 (5.762)	5.174** (3.016)
Manufacturing Share	2.804 (8.353)	.081 (.452)	-.316 (.528)	.0052 (.0120)	-3.434** (2.056)	-1.544* (1.082)
HOURS DEPENDENT VARIABLE						
Growth	-.452 (1.867)	-.076 (.102)	.239*** (.116)	-.00643*** (.00266)	.263 (.449)	.355* (.252)
Wage Premium	-17.24 (27.94)	.464 (1.487)	.854 (1.752)	-.0094 (.040)	3.349 (6.693)	2.538 (3.498)
Manufacturing Share	6.21 (9.68)	.0008 (.523)	-.558 (.613)	.0114 (.014)	-3.582* (2.379)	-.978 (1.247)
WAGES DEPENDENT VARIABLE						
Growth	.573 (1.115)	-.0073 (.060)	.0029 (.067)	-.00034 (.00158)	-.306 (.257)	.235* (.148)
Wage Premium	27.40* (17.04)	-1.225 (.900)	-1.238 (1.036)	.0264 (.024)	4.675 (3.930)	2.673 (2.117)
Manufacturing Share	-7.922* (5.871)	.398 (.315)	.260 (.365)	-.00552 (.00859)	-1.527 (1.418)	-1.241** (.740)
INCOME/NEEDS RATIO DEPENDENT VARIABLE						
Growth	.796 (.877)	-.050 (.048)	-.0023 (.054)	.00032 (.00124)	.305* (.211)	.436*** (.173)
Wage Premium	4.124 (12.961)	.017 (.690)	-.433 (.814)	.0161 (.019)	1.646 (3.158)	4.378*** (1.655)
Manufacturing Share	-1.122 (4.517)	-.042 (.244)	.328 (.285)	-.0109** (.0066)	-1.139 (1.123)	-0.970* (.590)

Notes: Standard errors in parentheses. *, **, and *** indicate statistical significance at 20%, 10%, and 5% for 2-tail test. Results come from 8 regressions, with 4 types of dependent variables and males and females analyzed separately. All regressions are zero-lag regressions, with serial correlation correction, and includes all of usual control variables for year dummies and demographic characteristics (see notes to Table 1). Sample sizes for different dependent variables are: earnings: 14,463 for males; 19,780 for females; hours: 14,468; 19,795; wages: 13,600; 13,217; income/needs: 12,994; 16,998.

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Table 3
Estimates of How Effects of MSA Labor Demand on Individual Labor Market Outcomes Vary with Predicted Economic Status

MSA Labor Demand Variable	Males			Females		
	Coefficient on Demand Variable By Itself	Interaction of Demand Variable with Predicted Economic Status	Effect of Demand Variable at Mean Predicted Economic Status	Coefficient on Demand Variable By Itself	Interaction of Demand Variable with Predicted Economic Status	Effect of Demand Variable at Mean Predicted Economic Status
EARNINGS DEPENDENT VARIABLE						
Growth	6.551*** (2.958)	-.583*** (.289)	.587*** (.231)	-1.175 (1.773)	.184 (.202)	.415* (.256)
Wage Premium	43.14 (42.84)	-3.60 (4.20)	6.312*** (3.105)	37.68* (25.92)	-3.59 (2.97)	6.662*** (3.348)
Manufacturing Share	-35.07*** (15.34)	3.32*** (1.50)	-1.106 (1.081)	-3.06 (9.05)	.09 (1.04)	-2.282** (1.195)
HOURS DEPENDENT VARIABLE						
Growth	.269 (.216)	-1.178*** (.445)	.224 (.218)	.641* (.398)	.138 (.252)	.488** (.286)
Wage Premium	6.31*** (2.88)	-10.41* (6.45)	5.914*** (2.914)	2.05 (5.61)	-2.26 (3.72)	4.559 (3.762)
Manufacturing Share	-.76 (1.01)	10.32*** (2.39)	-.368 (1.016)	-1.54 (2.00)	.05 (1.30)	-1.596 (1.344)
WAGES DEPENDENT VARIABLE						
Growth	1.123* (.811)	-.253 (.297)	.455*** (.149)	1.079* (.818)	-.408 (.365)	.193 (.173)
Wage Premium	-3.20 (11.89)	.74 (4.44)	-1.246 (2.006)	15.35 (12.48)	-6.27 (5.61)	1.738 (2.370)
Manufacturing Share	-3.25 (4.35)	1.06 (1.59)	-.452 (.710)	-16.29*** (4.51)	7.02*** (1.99)	-1.050 (.831)
INCOME/NEEDS DEPENDENT VARIABLE						
Growth	.960 (.361)	-.360 (.252)	.532*** (.152)	.973*** (.261)	-.532*** (.196)	.453*** (.151)
Wage Premium	5.44 (5.08)	-1.91 (3.75)	3.167* (1.986)	-1.15 (3.74)	3.06 (2.95)	1.843 (1.980)
Manufacturing Share	-.36 (1.83)	-.02 (1.31)	-.384 (.701)	-.53 (1.35)	.15 (1.04)	-.383 (.702)

Notes Standard errors are in parentheses. *, **, and *** indicate statistical significance at 20%, 10%, and 5% level, 2-tail test. All specifications include a complete set of time dummies and demographic characteristics, and are estimated correcting for first order serial correlation. As described in test, interaction terms show interaction between each of 3 economic development variables, and predicted level of variable whose change is the dependent variable. Prediction equation regresses level on demographic characteristics and actual average level of that variable from years t-3 to t-5. Number of observations, for males and females, is: earnings, 9,819 and 13,476; hours, 10,070 and 14,093; wages, 9,128 and 7,347; income/needs, 7,955 and 9,998. The difference in sample sizes for the earnings equation and hours equation is greater here because average real earnings from t-3 to t-5 is undefined for individuals not living in an MSA during one of those years. Means and standard deviations of predicted economic status level variables are (remember that these variable are logarithmic): earnings--mean of 10.23 (standard deviation=.71) for males, 8.64 (1.26) for females; full-time equivalent hours (hours/2000): .04 (.48), -1.11 (1.25); real wages: 2.64 (.47), 2.17 (.47); income/needs: 1.19 (.54); .98 (.66).

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Table 4
Probit Estimates of "Long-Run" Effects of MSA Labor Demand Variables
on Poverty Entry and Exit

MSA Labor Demand Variable	Long-Run Coefficient on Demand Variable	Long-Run Coefficient on Interaction Term Between Demand Variable and Initial Income/Needs Ratio	Probit "Effect" at Means	Derivative of Probability at Means of All Variables
Poverty Exit--Females				
Growth	10.59*** (3.50)	5.90 (12.81)	9.56*** (3.56)	2.90
Wage Premium	-28.89 (51.17)	-76.64 (201.31)	-15.48 (50.32)	-4.70
Manufacturing Share	13.99 (19.09)	-20.43 (79.37)	17.57 (19.08)	5.33
Poverty Exit--Males				
Growth	2.39 (7.82)	-69.72** (35.72)	13.20** (7.98)	4.44
Wage Premium	20.97 (126.49)	-554.11 (540.01)	106.86 (131.92)	35.94
Manufacturing Share	20.09 (50.39)	472.28*** (212.05)	-53.11 (53.48)	-17.86
Poverty Entry--Females				
Growth	-9.26*** (4.44)	6.68 (5.39)	-1.40 (3.41)	-.35
Wage Premium	-38.29 (67.45)	86.88 (85.08)	63.97 (52.13)	15.83
Manufacturing Share	-7.29 (24.00)	-14.16 (30.22)	-23.96* (17.67)	-5.93
Poverty Entry--Males				
Growth	-13.05*** (6.50)	8.54 (7.47)	-2.30 (4.67)	-.03
Wage Premium	-37.78 (91.45)	-32.13 (105.92)	-78.23 (65.25)	-.86
Manufacturing Share	29.88 (33.34)	-6.55 (39.37)	21.63 (23.66)	.24

Notes Standard errors are in parentheses. *, **, and *** indicate statistical significance at 20%, 10%, and 5% level, 2-tail test. The specifications include current values and two lags in all demand variables and interaction terms. The reported "long-run" coefficients are the sum of the coefficients on the current variable and the two lags, and represent the effects after two years of a change at year t-2. The probit "effect" is defined as $A+B(\bar{Y})$ where A is the long-run coefficient on the demand variable by itself, B is the long-run interaction coefficient, and $\bar{Y}$ is the means initial log of the (income/needs ratio + .20). .20 is added to all observations to avoid the problem of taking the logarithm of zero for some observations. The mean initial income/needs ratios (standard deviations) for the four samples are: female exit: -.175 (.260); male exit: -.155 (.294); female entry: 1.177 (.504); male entry: 1.259 (.474). The sample sizes for the four probit models are: female exit: 1,175; male exit: 268; female entry: 7,258; male entry: 6,399. All models include all the time dummies and demographic controls noted in Table 1.

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